

1 This listing of claims will replace all prior versions, and listings, of claims
2 in the application:

3
4 **Listing of Claims**

5
6 Claim 1 (Canceled)

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8 *Sub 1* Claim 2 (Previously presented): A method comprising:
9 initiating a search for images based on at least one query keyword in a
10 query;
11 identifying, during the search, first images having associated keywords that
12 match the query keyword and second images that contain low-level features
13 similar to those of the first images; and
14 ranking the first and second images.

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16 Claim 3 (Previously presented): A method as recited in claim 2, further
17 comprising presenting the first and second images.
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Claim 4 (Previously presented): A method comprising:

1 initiating a search for images based on at least one query keyword in a
2 query;
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4 identifying, during the search, first images having associated keywords that
5 match the query keyword and second images that contain low-level features
6 similar to those of the first images;
7 presenting the first and second images to a user; and
8 monitoring feedback from the user as to which of the first and second
9 images are relevant to the query.

4,
Claim 5 (Previously presented): A method comprising:

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11 initiating a search for images based on at least one query keyword in a
12 query;
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14 identifying, during the search, first images having associated keywords that
15 match the query keyword and second images that contain low-level features
16 similar to those of the first images;
17 presenting the first and second images to a user;
18 receiving feedback from the user as to whether the first and second images
19 are relevant to the query; and
20 learning how the first and second images are identified based on the
21 feedback from the user.

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1 Claim ~~6~~ (Previously presented): A method as recited in claim ~~2~~¹, wherein
2 the monitoring comprises
3 presenting the first and second images to a user;
4 receiving feedback from the user as to whether the first and second images
5 are relevant to the query further comprising:
6 refining the search to identify additional images that contain low-level
7 features similar to those of the images indicated by the user as being relevant to the
8 query.

6.

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10 Claim ~~7~~ (Previously presented): A method as recited in claim ~~2~~¹, wherein
11 the monitoring comprises
12 presenting the first and second images to a user;
13 receiving feedback from the user as to whether the first and second images
14 are relevant to the query further comprising:
15 assigning a large weight to an association between the query keyword and
16 the images deemed relevant by the user.

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18 Claim ~~8~~ (Original): A method as recited in claim ~~7~~⁶, further comprising
19 grouping the low-level features of the images deemed relevant by the user.
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Claim ~~9~~⁸ (Previously presented): A method as recited in claim ~~2~~¹, wherein the monitoring comprises

presenting the first and second images to a user;

receiving feedback from the user as to whether the first and second images are relevant to the query further comprising:

assigning a small weight to an association between the query keyword and the example image.

9.
Claim ~~10~~⁸ (Original): A method as recited in claim ~~9~~⁸, further comprising identifying additional images with low-level features similar to those of the example image.

10.
Claim ~~11~~¹⁰ (Previously presented): A computer readable medium having computer-executable instructions that, when executed on a processor, perform the method as recited in claim ~~2~~¹.

11.
~~5.2.3~~ Claim ~~12~~¹¹ (Original): A method comprising:

permitting entry of both keyword-based queries and content-based queries;

finding images using both semantic-based image retrieval and low-level feature-based image retrieval;

presenting the images to a user so that the user can indicate whether the images are relevant; and

conducting semantic-based relevance feedback and low-level feature-based relevance feedback in an integrated fashion.

1 Claim ^{12.}~~13~~ (Original): A method as recited in claim ¹¹~~12~~, further comprising
2 ranking the images.

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4 Claim ^{13.}~~14~~ (Original): A method as recited in claim ¹¹~~12~~, further comprising
5 using images indicated as being relevant to find additional images.

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7 Claim ^{14.}~~15~~ (Original): A computer readable medium having computer-
8 executable instructions that, when executed on a processor, perform the method as
9 recited in claim ¹¹~~12~~.

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11 Claims 16-19 (Canceled)

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13 ^{15.}
14 *Sub 21* Claim ~~20~~ (Original): A method comprising:
15 presenting a result set of images that are returned from an image retrieval
16 search of a query having at least one keyword;
17 monitoring feedback from a user as to whether the images in the result set
18 are relevant to the query;
19 in an event that the user selects at least one image as being relevant to the
20 query, associating the keyword in the query with the selected image to form a first
21 keyword-image association and assigning a comparatively large weight to the first
22 keyword-image association; and
23 in an event that the user identifies an example image for refinement of the
24 search, associating the keyword in the query with the example image to form a
25 second keyword-image association and assigning a comparatively small weight to
the second keyword-image association.

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2 Claim ¹⁶21 (Original): A method as recited in claim ¹⁵20, further comprising
3 conducting both content-based image retrieval and semantic-based image retrieval.

4
5 Claim ¹⁷22 (Original): A method as recited in claim ¹⁵20, further comprising
6 presenting the result set of images in a user interface, the user interface facilitating
7 the user feedback by allowing the user to indicate which images are more relevant
8 and which images are less relevant.

9
10 Claim ¹⁸23 (Original): A computer readable medium having computer-
11 executable instructions that, when executed on a processor, perform the method as
12 recited in claim ¹⁵20.

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14 Claim 24 (Previously presented): A method comprising:
15 computing, for each category, a representative feature vectors of a set of
16 existing images within the category;
17 determining a set of representative keywords that are associated with the
18 existing images in each category;
19 comparing, for each new image, the low-level feature vectors of the new
20 image to the representative feature vectors of the existing images in each category
21 to identify a closest matching category; and
22 labeling the new image with the set of representative keywords associated
23 with the closest matching category.
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1 Claim 25 (Previously presented): A method as recited in claim 24, further
2 comprising using user feedback to selectively add and/or remove keywords from
3 the new image.

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5 Claim 26 (Original): A method as recited in claim 24, further comprising:
6 placing the labeled new images into a holding category;
7 evaluating the labeled new images in the holding category to determine if
8 any of the keywords associated with the labeled new image match the
9 representative keywords from each category; and
10 assigning the labeled new image to the category that best matches the
11 keywords associated with the labeled new image.

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13 Claim 27 (Canceled)

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15 ~~Sub D4~~ Claim 28 (Previously presented): An image retrieval system comprising:
16 a query handler to handle both keyword-based queries having one or more
17 search keywords and content-based queries having one or more low-level features
18 of an image; and
19 a feature and semantic matcher to identify at least one of (1) first images
20 having keywords that match the search keywords from a keyword-based query, and
21 (2) second images having low-level features similar to the low-level features of a
22 content-based query, wherein the feature and semantic matcher ranks the images.

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24 ~~20~~ Claim 29 (Previously presented): An image retrieval system as recited in
25 claim 28, wherein the query handler comprises a natural language parser.

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2 ²¹ Claim ~~20~~ (Previously presented): An image retrieval system as recited in
3 claim ~~28~~, wherein the query handler comprises:

4 a parser to parse text-based queries; and

5 a concept hierarchy to define various categories of images.

6
7 ²² Claim ~~31~~ (Previously presented): An image retrieval system as recited in
8 claim ~~28~~, further comprising a user interface to present the images identified by the
9 feature and semantic matcher.

10
11 ^{Sub Del} Claim 32 (Previously presented): An image retrieval system comprising:
12 a query handler to handle both keyword-based queries having one or more
13 search keywords and content-based queries having one or more low-level features
14 of an image;

15 a feature and semantic matcher to identify at least one of (1) first images
16 having keywords that match the search keywords from a keyword-based query, and
17 (2) second images having low-level features similar to the low-level features of a
18 content-based query;

19 a user interface to present the images identified by the feature and semantic
20 matcher to a user, the user interface allowing the user to indicate whether the
21 images are relevant to the query; and

22 a feedback analyzer to train the image retrieval system based on user
23 feedback as to relevancy.
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19 Claim ~~33~~ (Previously presented): An image retrieval system as recited in claim ~~28~~, further comprising:

3 a user interface to present the images identified by the feature and semantic
4 matcher to a user, the user interface allowing the user to identify an example
5 image; and

6 the feature and semantic matcher being configured to identify additional
7 images that contain low-level features similar to those of the example image.

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19 Claim ~~34~~ (Previously presented): An image retrieval system as recited in claim ~~28~~, further comprising:

11 a user interface to present the images identified by the feature and semantic
12 matcher to a user, the user interface allowing the user to identify which images are
13 relevant to a particular search query; and

14 a feedback analyzer to assign a large weight to an association between the
15 search keywords and the images identified as relevant by the user.

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17 Claim ~~35~~ (Original): An image retrieval system as recited in claim ~~34~~,
18 wherein the feedback analyzer groups the low-level features of the images
19 identified as relevant by the user.

1 Claim 36 (Previously presented): An image retrieval system as recited in
2 claim 28, further comprising:

3 a user interface to present the images identified by the feature and semantic
4 matcher to a user, the user interface allowing the user to identify an example image
5 as being less relevant or irrelevant to the query; and

6 a feedback analyzer to assign a small weight to an association between the
7 search keywords and the example image.

8
9 Claim ²⁷~~27~~ (Original): An image retrieval system as recited in claim 36,
10 wherein the feature and semantic matcher identifies additional images with low-
11 level features similar to those of the example image.

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13 [Claim 38 (Canceled)

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15 ³⁹~~39~~ Claim 39 (Previously presented): A computer-readable medium having
16 computer-executable instructions that, when executed, directs a computer to:

17 find images using both semantic-based image retrieval and low-level
18 feature-based image retrieval;

19 present the images to a user so that the user can indicate whether the images
20 are relevant; and

21 concurrently conduct semantic-based relevance feedback and low-level
22 feature-based relevance feedback.

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Claim 40 (original): A program as recited in claim 39, further comprising
computer-executable instructions that, when executed, direct a computer to rank
the images.

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Claim 41 (Original): An information retrieval program, embodied on the
computer-readable medium, comprising the computer-executable instructions of
claim 39.

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Claim 42 (Previously presented): A computer readable medium having
computer-executable instructions that, when executed on a processor, perform the
method as recited in claim 4.³

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